MOTORISED TORQUE TESTER DRIVETORK

USER'S MANUAL

Your equipment reference :

N°: …… Date: ……..

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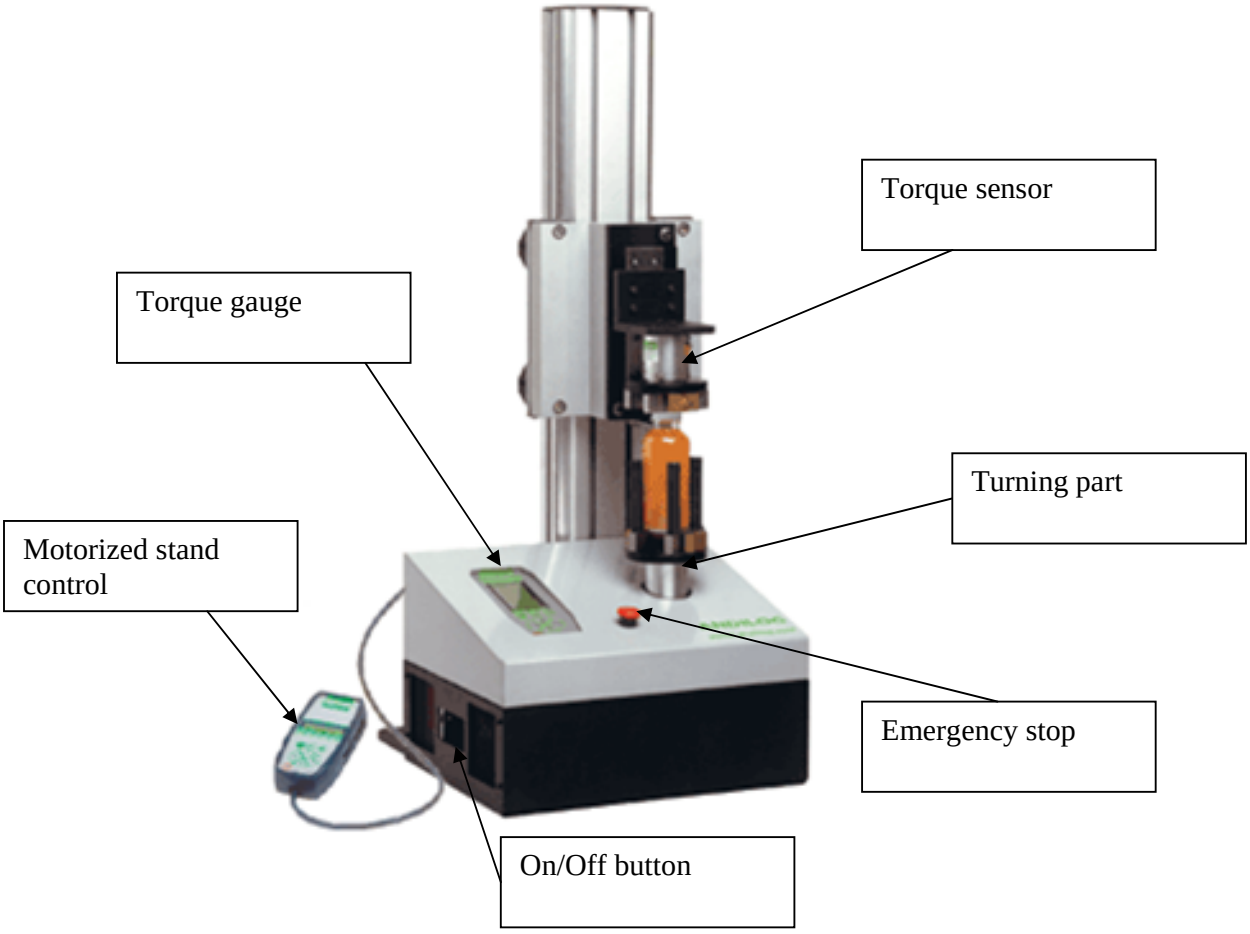
1 Introduction

WE THANK YOU VERY MUCH FOR CHOSING OUR DRIVETORK SYSTEM AND ARE HOPING YOU WILL BE FULLY SATISFIED.

2 Installation

Check that your equipment has not been damaged during transportation.

Place the DRIVETORK on a stable table and connect it to the 110V / 220V power supply.



To turn the stand ON, unlock the Red button on the top of the stand and turn on the button on the left side of the stand.
To turn the stand OFF, turn off the button on the left side of the stand.

For the first use the default speed settings are **1 rd/mn**. The limit stops are setting to STOP and electronic limit stops are desactivated. The number of cycles is 0.
When turned ON, the following message is displayed:

ANDILOG DRIVETORK v2.0 us

When not running the screen flashes and displays the displacement and speed values; the speed setting values and the electronical limit stops distance.

The digital controller will allow you manage the frame and set up test stand parameters.

3 Starting with DRIVETORK

A) Description of the remote control

The keys of remote control have different features depending of the run mode of the Drivetork. There are two run modes described below: STANDARD and SETUP.

Running in STANDARD mode

KEY #	NAME	DESCRIPTION
0	Display	Gives information regarding the status of the Drivetork. Shows displacement value, speed value, test in process, error messages, etc
1	MENU button	Access to the SETUP mode
2	+ button	No function
3	- button	No function
4	Up button	Start in clockwise direction
5	Down button	Start in anti-clockwise direction
6	Up high speed button	Start in clockwise direction at full speed
7	Down high speed button	Start in anti-clockwise direction at full speed
8	Reset	Reset the displacement value if the motor is

		stopped

IF THE MOTOR IS RUNNING, PRESS ANY KEY TO STOP THE MACHINE

Running in SETUP mode

KEY #	NAME	DESCRIPTION
1	MENU button	Access to STANDARD mode and save data
2	+ button	Select the next parameter
3	- button	Select the previous parameter
4	Up button	Increase parameter value by 1 unit
5	Down button	Decrease parameter value by 1 unit
6	Up high speed button	Increase parameter value by 100 units
7	Down high speed button	Decrease parameter value by 100 units
8	Reset	No function

NOTE: When the motor is stopped, you can reset the angle value to zero by pressing the Reset key. This makes the angle origin relative.

The DRIVETORK can run in two modes: "pulse" or "Continuous":

B) Emergency stop

The Drivetork test stand has a power emergency stop switch on the middle of the cover. This emergency stop turns off all power to the test stand. To restart the Drivetork, you must unlock this switch by rotating it clockwise.

Note: If you stop the Drivetork with the emergency stop during a test, it is possible that the angle value was not saved correctly. You must check this value when you turn on the Drivetork after an emergency stop.
If the motor is off when you use the emergency stop to turn off your equipment, the angle value is saved correctly.

C) Settings

Before using your equipment, review all of the available parameters to help you understand the numerous features of this tester.

1. Speed

The first two menus are to setup the clockwise and anti-clockwise speeds. These two speeds can be managed separately. Use the & keys to increase or decrease the value by 0.05rd/min and the & keys to increase and decrease the speed by 5 rd/min.

2. Limit stops

A limit stop is a fixed point where the stand is going to stop during rotating. If two or three different limit stops are active, the first limit stop the stand meets will stop the tester. This means that all the other limit stops in the same direction will be ignored.

There are three different limit stops on the Drivetork: position, time and torque.

Pos. stop: The position stops are defined by angle. These limits can be active or not. The displacement value and the actions are available in the menus "Pos. stop ↷ " for the clockwise travel and in "Pos. stop ↶ " for the anti-clockwise. Note that the value for this displacement is relative to the 0 position of the frame. The clockwise travel is positive and the anti- clockwise travel is negative.

When the position limit stops are active, three actions are possible:

- Inactive: The position limit is inactive
- Stop: Stop the frame when it reaches this limit
- Inverter: The Drivetork stops and moves in the opposite direction at the pre-define speed
- Delayed Inv.: The Drivetork stops and moves in the opposite direction at the pre-define speed after a time defined in the menu "Pause"

For example, if you put the following parameters:

- Speed ↷ 5 rd/min
- Speed ↶ 2 rd/min
- Pos. stop ↷ Stop
- Pos. stop ↷ 2 rd
- Pos. stop ↶ Inverter
- Pos. stop ↶ -1 rd
- All the other limits are Inactive.

Now, if you go back to the STANDARD mode, there are two possibilities:

1. Push on the key and then the key:
   The Drivetork is going to turn anti-clockwise 1 round at 2 rd/min then stop and turn clockwise 3rd (1 rd + 2 rd) at 5 rd/min and then stop
2. If you DON'T push the key, the position value on your Drivetork is for example +0.5rd and then you push the key:

The Drivetork is going to turn anti-clockwise of 1.5rd (+0.5 – (-1)) at 2rd/min then stop and turn clockwise 3rd (1rd + 2rd) at 5rd/min and then stop

Note: The clockwise and anti- clockwise position limit stops DON'T work if the Drivetork is in high speed mode

Time stop: The time stops are defined by a time of travel in seconds. These limits can be active or not. The time and the actions are available in the menus "Time stop ↷ " for the clockwise travel and in "Time stop ↶ " for the anti- clockwise.

When the time limit stops are active, three actions are possible:

- Inactive: The time limit is inactive
- Stop: Stop the frame when it reaches this limit
- Inverter: The Drivetork stops and turns in the opposite direction at the pre-define speed
- Delayed Inv.: The Drivetork stops and turns in the opposite direction at the pre-define speed after a time defined in the menu “Pause”

Note: The clockwise and anti-clockwise time limit stops DON’T work if the Drivetork is in high speed mode

Force stop (Option): The force stops are defined by force in Newtons. These limits can be active or not. The force value and the actions are available in the menus “Force stop ↶” for clockwise travel and in “Force stop ↷” for anti-clockwise travel.

When the force limit stops are active, three actions are possible:

- Inactive: The force limit is inactive
- Stop: Stop the frame when it reaches this limit
- Inverter: The Drivetork stops and moves in the opposite direction at the pre-defined speed
- Delayed Inv.: The Drivetork stops and moves in the opposite direction at the pre-defined speed after a time defined in the menu “Pause”

Note: The clockwise and anti-clockwise force limit stops DON’T work if the Drivetork is in high speed mode

Pause: Define the time the Drivetork is going to stop when it reaches one of the stop limits defined above setup in “Delayed Inv.”. This delay is available in the menus “Pause ↶” for the anti-clockwise limit stops and in “Pause ↷” for the clockwise limit stops.

Cycle: Define the number of cycles (between 1 and 255) the Drivetork is going to perform when it reaches clockwise and anti-clockwise limit stops configured in “Inverter” or “Delayed Inv”.

3. Other options

Pedal action: It’s possible to plug a foot pedal into the Drivetork. This menu defines what the Drivetork does after receiving the command from the pedal. The different actions are:

- Inactive: The pedal is inactive
- Stop: Stop the frame when pedal is pushed
- Start Pos.: The Drivetork moves clockwise
- Start Neg.: The Drivetork moves anti-clockwise
- ZERO: Put the position of the Drivetork to 0

In standard mode, when the Drivetork is moving, the pedal has the same feature as any key of the control panel. It means that if you push on the pedal during a test, the stand will stop.

Ext. 1 action: The control board of the Drivetork has two TTL inputs. These inputs are used to launch an action from another device. For example from the Centor force gauge. The menu “Ext. 1 action” defines the action when input 1 is active:

- Stop: Stop the frame
- Start Pos.: The Drivetork moves clockwise
- Start Neg.: The Drivetork moves anti-clockwise
- ZERO: Set the position of the Drivetork to 0

Ext. 2 action: The control board of the Drivetork has two TTL inputs. These inputs are used to launch an action from another device. For example from the Centor force gauge. The menu “Ext. 2 action” defines the action when the input 2 is active:

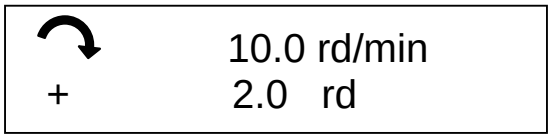
- Stop: Stop the frame
- Start Pos.: The Drivetork moves clockwise
- Start Neg.: The Drivetork moves anti-clockwise
- ZERO: Sets the position of the Drivetork to 0

Language: Defines if the menu of the Drivetork is in English or French.

4. Start a test

To start a test, you just push the or keys to go up or down following you’re your setup parameters. The Drivetork begins to move in the selected direction at the speed defined in the settings for this direction.

The display on the remote control shows the speed, the direction and the relative position.
For the example below, the Drivetork is turning clockwise at 10 rd/min and its position is +2 rd.



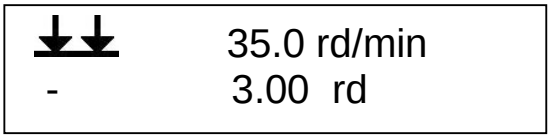
To stop the Drivetork, press any key of the remote control.
Note: If the Drivetork reaches any limit stop during the travel, it will execute the setup defined limit stop (for example, Inverter or Stop)

5. High speed

To move the plate of the stand at the high speed, for example to move your sample to the start position, use the & keys to go up or down as required.

The Drivetork starts to move in the selected direction at the high speed value and will continue to move as long as you press the or keys.

Example of the display during a high speed down travel:



Note: During high-speed travel, only the "Sensor Limit Stops" are active. The other limits (time, position…) are all inactive.

The high-speed mode should be used only to move the crosshead to the start position. When Drivetork setup is done, the high-speed mode is not required.

6. Reset the position

To set the position of the Drivetork to 0.00rd, press the key when **the motor is stopped**

4. Parameters and settings

To access to the parameters and settings, press the key.

The first parameter is the speed . When you are in this first menu, you can:

- Go to the next parameter by pressing the
- Change the parameter with or keys
- Go back to the standard mode by pressing . All the parameters are automatically saved and active.

The method to change the parameters in the setup mode is the same for all the parameters. The features available are shown in the menu depending of your settings. For example the menu for the cycles is available only if you setup at least one down and one up limit stop in Inverted or delayed Inv.

1. Speed setting

Press the key. The display shows "Speed " and the actual value of the up speed in rd/min. To increase the value of the clockwise speed press the key and to decrease this value, press the key. The speed increases or decreases with a step of 0.05 rd/min. If you want to change the speed with a step of 5 rd/min, you can use the & keys.

Speed
10.00 rd/min

To check your setting and go back to the running mode, press the key. To change the anti-clockwise speed setting, press the key.

If you press the key, the display is now:

Speed
150.00 mm/min

To increase the value of the anti-clockwise speed press the key and to decrease this value, press the key. The speed increases or decreases with a step of 0.05 rd/min. If you want to change the speed with a step of 5 rd/min, you can use the & keys.

To check your setting and go back to the running mode, press the key.

2. Limit stop setting

The limit stops are used to setup how your Drivetork is going to move during a test. There are four different limit stops:

- Mechanical limit stop — Maximum rotation of the plate
- Position limit stop — Virtual, setup in rd
- Time limit stop — Virtual, setup in seconds
- Force limit stop — Virtual, setup in Nm

For each limit stop, there are two different kinds: clockwise limit stop and anti-clockwise limit stop.

It's possible to have any or all of the limit stops active in the same time. The Drivetork will do the action that corresponds to the first limit stop reached. All the other limit stops will be ignored.

We strongly recommend the use of only one kind of virtual limit stop per test.

All the limit stops can be setup to stop the motor, reverse the travel direction, reverse the travel direction after a pause, or inactive. The setup of the clockwise and anti-clockwise stop limits is independent. Only the pause time is the same for all the limit stops.

By selecting a clockwise and anti-clockwise limit stop in "Delayed Inv.", you can create travel cycles.

Note: When the motor is stopped and the stand reaches a clockwise or anti-clockwise limit stop, the display shows the sign ↶ or ↷ to indicate that the plate reached a limit stop and can not move the tester beyond these points.

3. Mechanical limit stop

a) <u>Setup the action and the value of the mechanical limit stop</u>

When you are in the running mode, press the key. Then press the key to display:

Sensor stop ↷ Inactive

Then use the or keys to change the action when the stand reaches this limit. You have the following choices:

- Stop
- Inverter
- Delayed Inv.

When you have chosen the parameter you want, you can:

- Setup the clockwise limit stop by pressing . Then use the previous process to change the action

Sensor stop ↷ Inactive

- Or save and come back to the standard mode by pressing

4. Position limit stop

When you are in the run mode, press the Press the key. Then press the key to display:

Pos. stop ↷ Inactive

Then use the or keys to change the action when the stand reaches this limit.
You have the following choices:

- Stop
- Inverter
- Delayed Inv.

If one of the 3 previous is chosen, press the key to display the setup of the position value.

Pos. stop ↷ Stop

Pos. stop ↷ 2 rd

Then use the or keys to change the value of the travel limit. The & keys are available too to increase and decrease the speed quickly.
When you have chosen the position you want, you can:

- Setup the clockwise position limit stop by pressing . Then use the previous process to change the action and value

Pos. stop ↷ Inactive

- Or save and come back to the standard mode by pressing

5. Time limit stop

When you are in the run mode, press the key. Then press the key to display:

Time stop ↷ Inactive

Then use the or keys to change the action when the stand reaches this limit.
You have the following choices:

- Stop
- Inverter
- Delayed Inv.

If one of the 3 previous is chosen, a press on the key will display the setup of the time value.

Time stop ↷ Inverter		Time stop ↷ 30

Then use the or keys to change the value of the time limit in seconds. The & keys are available too to increase or decrease the time quickly.

When you have chosen the time you want, you can:

- Setup the clockwise time limit stop by pressing . Then use the previous process to change the action and value

Time stop ↷ Inactive

- Or save and come back to the standard mode by pressing

6. Force limit stop

When you are in the run mode, press the key. Then press the key to display:

Force stop ↷ Inactive

Then use the or keys to change the action when the stand reaches this limit.
You have the following choices:

- Stop
- Inverter
- Delayed Inv.

If one of the 3 previous is chosen, a press the key to display the setup of the force value.

Force stop ↷ Stop		Force stop ↷ 100

Then use the or keys to change the value of the force limit in Newtons. The & keys are available too to increase or decrease the force quickly.

When you have chosen the force limit you want, you can:

- Setup the clockwise force limit stop by pressing . Then use the previous process to change the action and value

Force stop ↷ Inactive

- Or save and come back to the standard mode by pressing

7. Delay setting

If at least one limit stop is set to “Delayed Inv.”, the parameter “Pause” is available in the menu. This menu allows you to set how long the Drivetork is going to stop after reaching one of the limit stops. The motor will stop during set seconds and then move in the opposite direction. This features is mainly designed the relaxation tests.
The stop times for the top and bottom limit stops are managed separately:

When you are in the running mode, press the key. Then press the key to display:

Pause ↷ 10

Then use the or keys to change the value.

When you have chosen the time you want, you can:

- Setup the clockwise time by pressing . Then use the previous process to change the action and value

Pause ↷ 10

- Or save and come back to the standard mode by pressing

8. Cycles setting

When at least one bottom and one top stop limit are set to “Delayed Inv.”, the menu “Cycle” is available.
A cycle is performed when the Drivetork reaches one bottom and one top limit. The number of cycles decreases by one when the Drivetork reaches the first limit. Then again one when it reaches the 3rd limit and another one for the 5th limit… until the number of cycles is 0. When cycle is 0, the Drivetork stops when it reaches a limit.
If you want to stop the Drivetork during a cycle, press any key on the remote control. The cycle counter is then set to zero.

When you are in the running mode, press the key. Then press the key to display:

Cycles
34

Then use the & & & keys to change the value from 0 to 255.

In running mode, the cycles counter is shown on the right of the display and decreases one cycle for each cycle done.

3 rd/min
+ 3.24 rd N34

9. Use the foot pedal (Option)

It’s possible to use a pedal to send instructions to the Drivetork. In fact the pedal simulates keys of the remote control. Most of the time this configuration is used when the Drivetork does same repetitive test and makes the work easier for the operator.

To enable this feature, when you are in the running mode, press the key. Then press the key to display:

Pedal
Inactive

Then use the or keys to change the action. You have the following choices:

- Inactive
- Stop -> Stop the test stand when you use the pedal
- Start Pos. -> Start the Drivetork turning clockwise

- Start Neg. -> Start the Drivetork turning anti-clockwise
- Zero -> Set the position to zero

Then go to back to the running mode the key.

10. Use the Inputs of the Drivetork

The Drivetork series has two TTL inputs that are activated by the detection of a falling edge signal. This detection can cause the following actions:

- Stop: Stop the frame when it reaches this limit
- Inverter: The Drivetork stops and moves in the opposite direction at the pre-defined speed
- Delayed Inv.: The Drivetork stops and moves in the opposite direction at the pre-defined speed after a time frame defined in the menu “Pause”
- Zero -> Set the position to zero

These features are generally used with the force gauge Centor Easy, Star or Dual to control the Drivetork when a force limit is reached by the force gauge. If you are using another device linked to the Drivetork, don’t forget to reset the signal to the original value.

To enable this feature, when you are in the running mode, press the key. Then press the key to display:

Ext. 1 action Inactive	OR	Ext. 2 action Inactive

Then use the or keys to change the action when the stand reach this limit. You have the following choices:

- Stop
- Inverter
- Delayed Inv.
- RAZ

11. Setup for a Centor torque gauge

Example 1: Stop the Drivetork when the gauge reaches 2Nm
The aim of this example is to setup the Drivetork and Centor torque gauge to stop the travel of the Drivetork when the force gauge reaches 2Nm. In the Centor Easy or Star, you have to setup:

LIMITS	
Chan. I	YES
UNIT	Nm
T1 :	2
T2 :	2
DEFAULT	INT
BEEP	NO
TYPE	COM
MENU	TDX

INPUTS	
Pedal	TAR
OUTPUTS	
Top1	F
Anal	NO
Digi	NO
RS232	NO
MENU	TDX

In the Centor Dual, you can setup a limit on the internal sensor or on the external one independently and/or simultaneously. For that you have to setup:

LIMITS	
Chan. I	YES
UNIT	Nm
T1 :	2
T2 :	2
DEFAULT	INT
BEEP	NO
TYPE	COM
Chan. E	YES
UNIT	Nm
T1 :	2
T2 :	3
DEFAULT	INT
BEEP	NO
TYPE	COM
MENU	TDX

INPUTS	
Pedal	TAR
OUTPUTS	
Top1	F
Top2	F
Anal	NO
Digi	NO
RS232	NO
MENU	TDX

Note: When the output of the Centor shows the parameter “F”, there is a voltage of 5V on the output pin of the connector (DB15). When the force gauge reaches the limit the output becomes 0V and activates the input on the Drivetork.

To reset the output to 5V, press the key of the torque gauge.

12. Change the language

This last parameter is to change the language of the menu and messages on the remote control of the Drivetork. The two languages available are French and English.

To enable this feature, when you are in the running mode, press the Press the key. Then press the key to display:

Language English

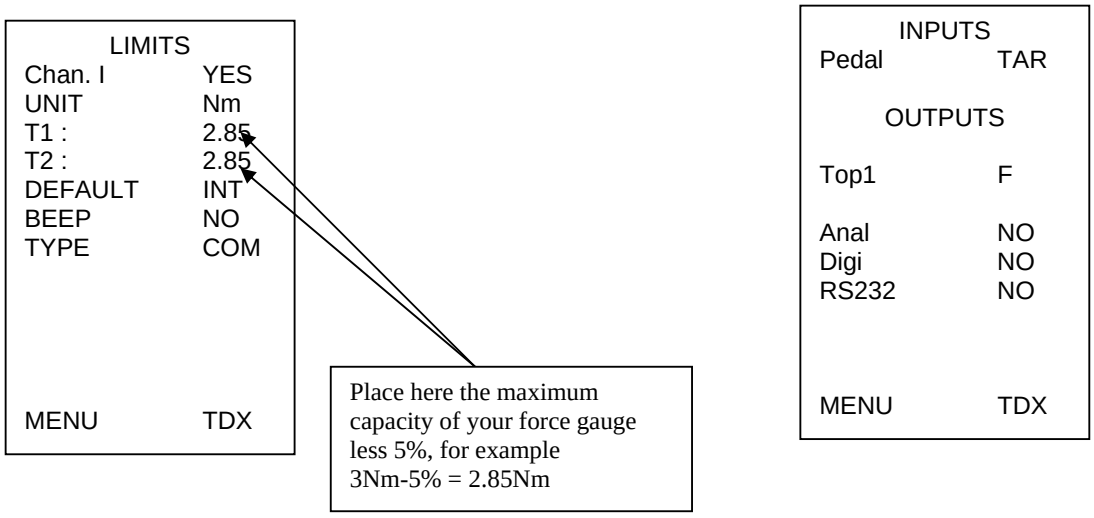
4. Security

1. Security housing

If your test stand is equipped security housing with a door, opening the door stops the test stand and disables the remote control. To use the setup mode, you have to close the door. When you close the door the stand will re-start the test from the door open point. You must re-start your test from the beginning.

2. Overload protection (Optional)

If you use the option to stop the Drivetork when your gauge reaches a limit, you can protect the Drivetork and your force gauge against overload.
For that you have to setup the force gauge, like this:

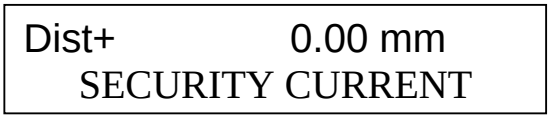


For that you have to setup the force gauge, like this:

Be careful, due to the inertia of the motor, it's possible that the Drivetork will not stop instantaneously. So you should set a limit lower than the capacity of your gauge.

3. Current security

If the Drivetork detects too much current for any reason, the stand is going to stop and you will have the following message:



You have to turn off the test stand and turn on again to reset this protection.

4. Internal travel limit

The Drivetork has internal travel limits to stop the test stand before it reaches the end of the power screw. These travel limits cut the power supply of the motor in the direction of the actual travel. You can move the test stand manually in the opposite direction.
Note: After this kind of stop, the value of the displacement could be modified. You have to check this value before doing another test.

5. Transmission error

If the remote control cannot communicate with the test stand (for example if the cable is broken), the two systems launch a reset process and switch to a security mode to stop the motor. You have to restart the test stand but your equipment probably needs maintenance.

! SECURITY !
ERROR CODE # 6

6. Security stop

If the system detects that a command is not properly completed, the display shows:

! SECURITY !
Door / Overl / Pos

In this case you have to check the following:

- If you have security doors, please check that all the doors are closed
- If there is an overload on the motor, remove this overload
- If the stand is in a travel limit position, move the stand in the opposite direction

7. Fuse

If you cannot turn on your equipment, it's possible that one of the two protective fuses is open. In this case, unplug the Drivetork and open the door on the back. There are 2 fuses:

- One of 5 A 5X20 mm
- One of 200 mA 5X20 mm

8. External wiring

Using of foot pedal or inputs requires specific wiring connected on the side of the column of the Drivetork.